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10/664,106	09/17/2003	Tsun-Yu Chang	01010A	4731

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EXAMINER	
MERCADO, JULIAN A	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/664,106	CHANG ET AL.	
	Examiner	Art Unit	
	Julian Mercado	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 11-04-03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The IDS filed on November 4, 2003 has been considered by the examiner.

Claim Objections

Claim 6 objected to because of the following informalities:

1. In claim 6 at line 3, it is suggested to change "repitition" to --repetition--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "soluble" and the term "insoluble" in claim 1 are relative terms which each renders the claim indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is the examiner's position that solubility is an equilibrium condition and not a binary condition as presently claimed, i.e. soluble or not soluble.

Claims 2-21 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8, 10, 12-15, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 97/08763 to Yamashita et al.

For purposes of detailed discussion, the examiner relies on the equivalent document to Yamashita et al. (U.S. Pat. 6,287,720 B1).

Regarding independent claim 1 and dependent claims where noted, Yamashita et al. teaches a rechargeable battery comprising an anode and cathode in opposing spaced relationship to each other and having two intermediate layers of differing porous separators/binders. See [13A] and [13B] as described throughout the reference and in particular in col. 12 line 62 et seq. and col. 13 line 45 et seq and line 58 et seq. The battery further comprises a non-aqueous electrolyte such as $LiClO_4$, *inter alia*. See col. 11 line 47 et seq. A first separator/binder is comprised by a mixture of polymer P_1, PVDF, and a particulate material M_1, α-Al_2O_3 or alumina. See col. 29 line 44 et seq. A second separator/binder is comprised by a mixture of polymer P_2, carboxymethyl cellulose, and a particulate material M_2, polyethylene. See col. 30 line 35 et seq., also applies to claims 14 and 15. Polymer P_1, PVDF, is soluble in a solvent S_1 which is 1-

methyl-2-pyrrolidone or NMP. Polymer P_2, carboxymethyl cellulose, is soluble in a solvent S_2, which is purified water. (ib., also applies to claims 14 and 15)

To the extent that the claimed solubility properties are understood for the reasons set forth under 35 U.S.C. 112, second paragraph (discussion above), the particulate materials M_1 and M_2 are non-soluble in their respective solvents S_1 and S_2 insofar as slurries are formed. See col. 29 line 66 and line 45. As to P_1, PVDF, being non-soluble in S_2, water, it is the examiner's position that the fluorine atoms around the carbon polymer backbone balances electronegative and electropositive charges and therefore renders PTFE relatively non-polar. Water, on the other hand, is a polar solvent. Furthermore, PVDF is hydrophobic. As to P_2, carboxymethyl cellulose, being non-soluble in S_1, NMP, it is the examiner's position that *at least relative to S_2*, water, (for the reasons set for under the 35 U.S.C. 112, second paragraph discussion above) carboxymethyl cellulose is non-soluble in NMP due to this solvent, while similarly polar, being an aprotic solvent.

As to claims 2-8, with respect to a prismatic stacked or cylindrical wound structure, both laminated and cylindrically wound battery structures are disclosed. See col. 2 line 4 et seq. The claimed stacking sequence of a repetition of (anode)-(first separator/binder)-(second separator/binder)-(cathode)-(second separator/binder)-(first separator/binder)-(anode) or a repetition of (cathode)-(first separator/binder)-(second separator/binder)-(anode)-(- second separator/binder)-(first separator/binder)-(cathode) is considered shown in Figures 4 and 5 and its accompanying description starting in col. 14 line 56 et seq.

With respect to claims 10 and 12, both solvents S_1 and S_2 are hydrophilic insofar as the latter is water and the former is miscible therewith.

With respect to claim 13, the polymers P_1 and P_2 may be polyethylene or polyethylene oxide, *inter alia*. See col. 7 line 6 et seq.

As to claim 18 where the polymer P_1 and/or polymer P_2 is a combination of two or more polymer materials, see col. 30 which teaches carboxymethyl cellulose combined with latex. See col. 30 line 37 and also col. 7 line 59 et seq.

Claim 20 recites that the first separator/binder is of a thickness in the range of 10-200 μm, and the second separator/binder is of a thickness in the range of 10-200 μm. Yamashita et al. disclose thicknesses of 100 nm to 100 μm, and thus teach the claimed thickness to the extent that these ranges overlap therewith.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9, 16, 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/08763. (Yamashita et al.)

The teachings of WO 97/08763 (Yamashita et al.) are discussed above.

Yamashita et al. further teaches that the solvents for S_1 and S_2 can be tetrahydrofuran (THF), *inter alia*. See col. 13 line 30 et seq. Thus, at least to the skilled artisan, employing a hydrophobic solvent would be an obvious modification in accordance with the routine experimentation of determining the solubility of the binder, determining the insolubility of the

dispersion media and the eventual evaporation thereof, as taught by Yamashita et al. See col. 13 line 30 et seq.

With respect to claims 16 and 17 where the first separator/binder the percent by weight of the particulate material is between 50% and 98% and between 80% and 97% and where the second separator/binder the percent by weight of the particulate material is between 50% and 98% and between 70% and 92%, Yamashita et al. teaches for the first range a percent by weight of 56.8%. See col. 29 line 67. As to the latter ranges, while 45.0 % is exemplified (see col. 30 line 47) absent of unexpected results it is asserted that the amount of particulate material is an optimizable parameter for a result-effective variable. *In re Boesch,* 617 F.2d 272, 205 USPQ 215 (CCPA 1980) Yamashita et al. in fact specifically disclose that "the binder is used in an amount of from 1/500 to 5/3, more preferably from 1/500 to 1/2, most preferably from 1/500 to 1/5, in terms of the volume ratio of the binder to the particles of at least one insulating substance." See col. 7 line 66 et seq.

Regarding claim 19 where the particulate material M_1 and/or particulate material M_2 is a combination of two or more particulate materials, in numerous instances throughout the disclosure Yamashita et al. disclose "at least one" of such particulate material, thus implicitly two or more particulate materials are disclosed, at least to one of ordinary skill in the art. See, for example, col. 7 lines 6-20.

As to claim 21, as discussed above Yamashita et al. disclose thicknesses of 100 nm to 100 μm for the separator/binders. Thus, absent of unexpected results a thickness in the range of 30-60 μm for the first and second separator/binder is considered within the purview of the skilled

artisan as a matter of routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/08763. (Yamashita et al.) in view of Kawakami et al. (U.S. Pat. 5,582,931)

The teachings of WO 97/08763 (Yamashita et al.) are discussed above.

Yamashita et al. does not explicitly teach the stacking sequence as a repetition of (anode)-(first separator/binder)-(second separator/binder)-(cathode)-(first separator/binder)-(second separator/binder)-(anode). However, Kawakami et al. teaches this configuration as shown in Figure 3 and its accompanying description. See col. 3 line 66 et seq. The skilled artisan would find obvious to employ this stacking sequence in order to obtain "a high voltage and a large capacity...."

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/08763 (Yamashita et al.) in view of Ohsawa et al. (U.S. Pat. 5,225,296)

The teachings of Yamashita et al. are discussed above.

Yamashita et al. does not explicitly teach a hydrophilic solvent such as methanol. However, Ohsawa et al. teaches water (as used by Ohsawa for the S_2 solvent) as an art-recognized equivalence to methanol, *inter alia*, particularly when used in a dispersion media, "the dispersion media, other than water, such as ethanol, methanol, acetone, and methylketone, can be employed." See col. 7 line 52 et seq. Thus, methanol would be an obvious substitution to the skilled artisan in recognition of its equivalence to similarly hydrophilic solvents such as

water itself and as a matter of routine experimentation in order to obtain a low cost dispersion medium which is also easily handled and dried. (ib.)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

jam

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER